



Patent
Attorney Docket No. 1034123-000150

JW

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

The Patent Application of
James T. Kadonaga et al.
Application No.: 10/516,982
Filing Date: June 21, 2005
Title: METHODS FOR PROMOTING
HOMOLOGOUS RECOMBINATION

) MAIL STOP: IDS
) Group Art Unit: Unknown
) Examiner: Unknown
) Confirmation No.: 1391
) Certificate of Mailing
) I hereby certify that this correspondence is being
deposited with the United State Postal Service on July
7, 2006 as First Class Mail in an envelope addressed
to the Commissioner for Patents, P.O. Box 1450,
Alexandria, VA 22313-1450.
By: Kim A. Cabello
Kim A. Cabello

INFORMATION DISCLOSURE STATEMENT
TRANSMITTAL LETTER

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Enclosed is a First Information Disclosure Statement (IDS) and accompanying form PTO-1449 for the above-identified patent application.

- No additional fee for submission of an IDS is required.
- The fee of 180 as set forth in 37 C.F.R. § 1.17(p) is also enclosed.
- A statement under 37 C.F.R. § 1.97(e) is also enclosed.
- A statement under 37 C.F.R. § 1.97(e), and the fee of 180 as set forth in 37 C.F.R. § 1.17(p) are also enclosed.
- Charge _____ to Deposit Account No. 02-4800 for the fee due.
- A check in the amount of _____ is enclosed for the fee due.
- Charge _____ to credit card for the fee due. Form PTO-2038 is attached.
- The Director is hereby authorized to charge any appropriate fees under 37 C.F.R. §§ 1.16, 1.17 and 1.21 that may be required by this paper, and to credit any overpayment, to Deposit Account No. 02-4800. This paper is submitted in duplicate.

Date: July 7, 2006

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

By: Susan B. Fuller

Susan B. Fuller
Registration No. 51979

P.O. Box 1404
Alexandria, VA 22313-1404
(858) 509.7300



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

James T. Kadonaga et al.

Application No.: 10/516,982

Filed: June 21, 2005

For: METHODS FOR PROMOTING
HOMOLOGOUS RECOMBINATION

) MAIL STOP: IDS
) Group Art Unit: Unknown
) Examiner: Unknown
) Confirmation No.: 1391
) Certificate of Mailing
) I hereby certify that this paper is being deposited with
the United States Postal Service on July 7, 2006 as first
class mail, in an envelope addressed to:
Commissioner for Patents, P.O. Box 1450, Alexandria,
VA 22313-1450.
) By: Kim A. Cabello
Kim A. Cabello

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the duty of disclosure as set forth in 37 C.F.R. § 1.56, the accompanying information is being submitted in accordance with 37 C.F.R. §§ 1.97 and 1.98.

Pursuant to 37 C.F.R. § 1.98, a copy of each of the documents cited is enclosed. However, copies of the listed U.S. patents and U.S. patent application publications are not enclosed since it is no longer required according to the July 11, 2003 waiver of the requirement for copies of cited U.S. patents and U.S. patent application publications in national patent applications filed after June 30, 2003 and international applications entering the national stage under 35 U.S.C. § 371 after June 30, 2003.

The documents are being submitted within three (3) months of the filing or entry of the national stage of this application or before the first Office Action on the merits, whichever is later. Since these documents are being filed within the time period set forth in 37 C.F.R. § 1.97(b), no fee or statement is required.

Information Disclosure Statement
Application No. 10/516,982
Attorney's Docket No. 1034123-000150
Page 2

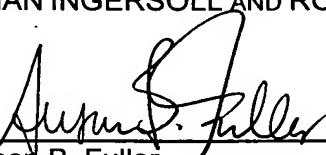
To assist the Examiner, the documents are listed on the attached form PTO-1449. It is respectfully requested that an Examiner initialed copy of this form be returned to the undersigned.

Respectfully submitted,

BUCHANAN INGERSOLL AND ROONEY LLP

Date: July 7, 2006

By:



Susan B. Fuller
Registration No. 51,979

P.O. Box 1404
Alexandria, VA 22313-1404
(858) 509.7300

**FIRST
INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Sheet

10

of

5

Complete if Known

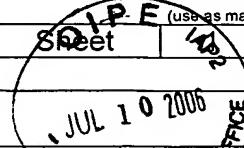
Application Number 10/516,982

Filing Date June 21, 2005

First Named Inventor James T. Kadonaga et al.

Examiner Name

Attorney Docket Number 1034123-000150



U.S. PATENT DOCUMENTS

Examiner Initials	Document Number	Kind Code (if known)	Name of Patentee or Applicant of Cited Document	Issue/Publication Date (MM-DD-YYYY)
	4,873,191			
	4,970,154			
	5,098,843			
	5,128,257			
	5,273,881			
	5,279,833			
	5,460,831			
	5,525,503			
	5,545,130			
	5,547,932			
	5,763,240			
	5,929,043			
	5,948,653			
	5,989,879			
	6,074,853			
	09/654,108			

FOREIGN PATENT DOCUMENTS

Examiner Initials	Document Number	Kind Code (if known)	Country	Date of Publication (MM-DD-YYYY)	STATUS					Cited in Spec
					Partial Translation	Eng. Lang. Summary	Report	Search	IPER	
	WO 91/06309									
	WO 93/24640									
	WO 99/37755									
	WO 99/60108									
	WO 00/56872									
	WO 00/63365									

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
	Almer et al. (1986). "Removal of positioned nucleosomes from the yeast PHO5 promoter upon PHO5 induction releases additional upstream activating DNA elements," <i>EMBO J.</i> 5:2689-2696.
	Baumann et al. (1996). "Human Rad51 protein promotes ATP-dependent homologous pairing and strand transfer reactions in vitro," <i>Cell</i> 87:757.
	Baumann et al. (1999). "Heteroduplex formation by human Rad51 protein: effects of DNA end-structure, hRP-A and hRad52," <i>J. Mol. Biol.</i> 291:363-374.
	Benson et al. (1998). "Synergistic actions of Rad51 and Rad52 in recombination and DNA repair," <i>Nature</i> 391:401-404.

Examiner Signature	Date Considered	
--------------------	-----------------	--

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with M.P.E.P. § 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.
CA 103928.1

**FIRST
INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

				<i>Complete if Known</i>	
		Application Number		10/516,982	
		Filing Date		June 21, 2005	
		First Named Inventor		James T. Kadonaga et al.	
		Examiner Name			
Sheet	2	of	5	Attorney Docket Number	1034123-000150

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
	Berinstein et al. (1992). "Gene replacement with one-sided homologous recombination," <i>Molec. Cell. Biol.</i> 12:360-367.
	Boyer et al. (2000). "Functional delineation of three groups of the ATP-dependent family of chromatin remodeling enzymes," <i>J. Biol. Chem.</i> 275:18864-18870.
	Budker et al. (1996). "PH-sensitive, cationic liposomes: a new synthetic virus-like vector," <i>Nature Biotechnology</i> 14:760-764.
	Bulger and Kadonaga (1994). "Biochemical reconstitution of chromatin with physiological nucleosome spacing," <i>Methods. Mol. Genet.</i> 5:241-262.
	Clark et al. (1991). "Isolation, DNA sequence, and regulation of a <i>Saccharomyces cerevisiae</i> gene that encodes DNA strand transfer protein alpha," <i>Molec. Cell. Biol.</i> 11:2576-2582.
	Cole-Strauss et al. (1996). "Correction of the mutation responsible for sickle cell anemia by an RNA-DNA oligonucleotide," <i>Science</i> 273:1386-1389.
	Cox and Lehman (1987). "Enzymes of general recombination," <i>Ann. Rev. Biochem.</i> 56:229-262.
	Cromie et al. (2001). "Recombination at double-strand breaks and DNA ends: conserved mechanisms from phage to humans," <i>Mol. Cell</i> 8:1163-1174.
	Doetschman et al. (1985). "The in vitro development of blastocyst-derived embryonic stem cell lines: formation of visceral yolk sac, blood islands and myocardium," <i>J. Embryol. Exp. Morph.</i> 87: 21-45.
	Dunderdale et al. (1991). "Formation and resolution of recombination intermediates by <i>E. coli</i> RecA and RuvC proteins," <i>Nature</i> 354:506.
	Dykstra et al. (1991). "Cloning and characterization of DST2, the gene for DNA strand transfer protein beta from <i>Saccharomyces cerevisiae</i> ," <i>Molec. Cell. Biol.</i> 11:2583-2592.
	Eisen, J.A. et al. (1995). "Evolution of the SNF2 family of proteins: subfamilies with distinct sequences and functions," <i>Nucleic Acids Res.</i> 23:2715-2723.
	Felgner et al. (1987). "Lipofection: a highly efficient, lipid-mediated DNA-transfection procedure," <i>Proc. Natl. Acad. Sci. USA</i> 84:7413-7417.
	Flaus, A. et al. (2001). "Mechanisms for ATP-dependent chromatin remodeling," <i>Curr. Opin. Genet. Dev.</i> 11:148-154.
	Fry, C. et al. (2001). "Chromatin remodeling enzymes: who's on first?" <i>Current Biology</i> 11:R185-R197.
	Fyodorov and Kadonaga (2001). "The many faces of chromatin remodeling: switching beyond transcription," <i>Cell</i> 106:523-525.
	Fyodorov et al. (2002). "Chromatin assembly using <i>Drosophila</i> systems," <i>Current Protocols in Molecular Biology</i> 21.7.1-21.7.27.
	Game, J.C. (1983). "Radiation-sensitive mutants and repair in yeast" In <i>Yeast genetics: fundamental and applied aspects</i> . J.F.T. Spencer, D. Spencer and A.R.W. Smith eds., pp. 105-137.
	Germond et al. (1975). "Folding of the DNA double helix in chromatin-like structures from simian virus 40," <i>Proc. Natl. Acad. Sci. USA</i> 72:1843-1857.
	Ghabrial, A. et al. (1998). "Okra and spindle-B encode components of the RAD52 DNA repair pathway and affect meiosis and patterning in <i>Drosophila</i> oogenesis," <i>Genes Dev.</i> 12:2711-2723.
	Giaever, G.N. et al. (1988). "Supercoiling of intracellular DNA can occur in eukaryotic cells," <i>Cell</i> 55:849-856.

Examiner Signature	Date Considered
--------------------	-----------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with M.P.E.P. § 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.
CA 103928.1

**FIRST
INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

				Complete if Known
Sheet		Application Number		10/516,982
		Filing Date		June 21, 2005
		First Named Inventor		James T. Kadonaga et al.
		Examiner Name		
	3	of	5	Attorney Docket Number

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.		
	Gorbelenya, A. et al. (1993). "Helicases: amino acid sequence comparisons and structure-function relationships," <i>Curr. Opin. Structural Biol.</i> 3:419-429.		
	Gupta et al. (1997). "Activities of human recombination protein Rad51," <i>Proc. Natl. Acad. Sci. USA</i> 94:463-468.		
	Hasty et al. (1991). "The length of homology required for gene targeting in embryonic stem cells," <i>Molec. Cell. Biol.</i> 11:5586-5591.		
	Ho et al. (1995). "Stem cells as vehicles for gene therapy: novel strategy for HIV infection," <i>Stem Cells</i> 13 (suppl. 3):100-105.		
	Hooper et al. (1987). "HPRT-deficient (Lesch-Nyhan) mouse embryos derived from germline colonization by cultured cells," <i>Nature</i> 326: 292-295.		
	Inaba et al. (1992). "Generation of large numbers of dendritic cells from mouse bone marrow cultures supplemented with Granulocyte/Macrophage colony-stimulating factor," <i>J. Exp. Med.</i> 176:1693-1702.		
	Ito et al. (1999). "ACF consists of two subunits, Acf1 and ISWI, that function co-operatively in the ATP-dependent catalysis of chromatin assembly," <i>Genes Dev.</i> 13:1529-1539.		
	Jeong et al. (1991). "Chromatin assembly on plasmid DNA in vitro, apparent spreading of nucleosome alignment from one region of pBR327 by histone H5," <i>J. Mol. Biol.</i> 222:1131-1147.		
	Kanaar, R. et al. (1998). "Molecular mechanisms of DNA double strand break repair" <i>Trends Cell Biol.</i> 8:483-489.		
	Kingston, R.E. et al. (1999). "ATP-dependent remodeling and acetylation as regulators of chromatin fluidity," <i>Genes Dev.</i> 13:2339-2352.		
	Kolodner et al. (1987). "Purification and characterization of an activity from <i>Saccharomyces cerevisiae</i> that catalyzes homologous pairing and strand exchange," <i>Proc. Natl. Acad. Sci. (U.S.A.)</i> 84:5560-5564.		
	Kooistra et al. (1999). "The <i>Drosophila melanogaster</i> DmRAD54 gene plays a crucial role in double-strand break repair after P-element excision and acts synergistically with KU70 in the repair of X-ray damage," <i>Mol. Cell. Biol.</i> 19:6269-6275.		
	Kooistra et al. (1997). "The <i>Drosophila melanogaster</i> RAD54 homolog, DmRAD54, is involved in the repair of radiation damage and recombination," <i>Mol. Cell. Biol.</i> 17:6097-6104.		
	Kornberg, R.D. et al. (1999). "Chromatin-modifying and -remodeling complexes," <i>Curr. Opin. Genet. Dev.</i> 9:148-151.		
	Kotani, H. et al. (1994). "DNA cruciforms facilitate in vitro strand transfer on nucleosomal templates," <i>Mol. Gen. Genet.</i> 243:681-690.		
	Kowalczykowski, S. et al. (1994). "Biochemistry of homologous recombination in <i>E. coli</i> ," <i>Microbiol. Rev.</i> 58:401-465.		
	Maguire et al. (1994). "Gem: An induced, immediate early protein belonging to the Ras Family," <i>Science</i> 265:241-244.		
	Mannino et al. (1998). "Liposome mediated gene transfer," <i>BioTechniques</i> 6:682-690.		
	Masson, J. et al. (2001). "The Rad51 and Dmc1 recombinases: a non-identical twin relationship," <i>Trends Biochem. Sci.</i> 26:131-136.		
	Mazin et al., (2000). "Rad54 protein is targeted to pairing loci by the Rad51 nucleoprotein filament," <i>Mol. Cell</i> 6:583-592.		
	Mazin et al. (2000). "Tailed duplex DNA is the preferred substrate for Rad51 protein-mediated homologous pairing," <i>EMBO J.</i> 19:1148-1156.		

Examiner Signature		Date Considered
--------------------	--	-----------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with M.P.E.P. § 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.
CA 103928.1

**FIRST
INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

				Complete if Known
		Application Number	10/516,982	
		Filing Date	June 21, 2005	
		First Named Inventor	James T. Kadonaga et al.	
		Examiner Name		
Sheet	4	of	5	Attorney Docket Number

1034123-000150

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
	McMahon and Bradley (1990). "The Wnt-1 (int-1) proto-oncogene is required for development of a large region of the mouse brain," <i>Cell</i> 62: 1073-1085.
	Moore et al. (1991). "The human homologous pairing protein HPP-1 is specifically stimulated by the cognate single-stranded binding protein hRP-A," <i>Proc. Natl. Acad. Sci. (U.S.A.)</i> 88:9067-9071.
	New, J.H. et al. (1998). "Rad52 protein stimulates DNA strand exchange by Rad51 and replication protein A," <i>Nature</i> 391:407-410.
	Paques, F. et al. (1999). "Multiple pathways of recombination induced by double-strand breaks in <i>S. cerevisiae</i> ," <i>Microbiol. Mol. Biol. Rev.</i> 63:349-404.
	Pazin et al. (1997). "Nucleosome mobility and the maintenance of nucleosome positioning," <i>Science</i> 276:809-812.
	Petrini et al. (1997). "The RAD52 epistasis group in mammalian double strand break repair" <i>Semin. Immunol.</i> 9:181-188.
	Petukhova, G. et al. (1998). "Catalysis of homologous DNA pairing by yeast Rad51 and Rad54 proteins," <i>Nature</i> 393:91-94.
	Petukhova, G. et al. (1999). "Yeast Rad54 promotes Rad51-dependent homologous DNA pairing via ATP hydrolysis-driven change in DNA double helix conformation," <i>J. Biol. Chem.</i> 274:29453-29462.
✗	Ramds, J. et al. (1991). "Nucleosomes on linear duplex DNA allow homologous pairing but prevent strand exchange promoted by RecA protein," <i>PNAS USA</i> , vol. 88, pp.1344-1348.
	Robertson et al. (1986). "Germ-line transmission of genes introduced into cultured pluripotential cells by retroviral vector," <i>Nature</i> 323: 445-448.
	Robertson, E. J. (1987) <i>In Teratocarcinomas and Embryonic Stem Cells: A Practical Approach</i> . E. J. Robertson, ed., Oxford: IRL Press, Ch 4, p. 71-112.
	Roca, A. I. et al. (1990). "The RecA protein: structure and function," <i>Crit. Rev Biochem. Molec. Biol.</i> 25:415-456.
	Shen et al. (2000). "A chromatin remodeling complex involved in transcription and DNA processing," <i>Nature</i> 406:541-544.
	Shinohara, A. et al. (1998). "Stimulation by Rad52 of yeast Rad51-mediated recombination," <i>Nature</i> 391:404-407.
	Shulman et al. (1990). "Homologous recombination in hybridoma cells: dependence on time and fragment length," <i>Molec. Cell. Biol.</i> 10:4466-4472.
	Simpson, R.T. et al. (1985). "Chromatin reconstituted from tandemly repeated cloned DNA fragments and core histones: a model system for study of higher order structure," <i>Cell</i> 42:799-808.
	Sinden, R. et al. (1980). "Torsional tension in the DNA double helix measured with trimethylpsoralen in living <i>E. coli</i> cells: analogous measurements in insects and human cells," <i>Cell</i> 21:773-783.
	Sugiyama, T. et al. (1997). "A single-stranded DNA-binding protein is needed for efficient presynaptic complex formation by the <i>S. cerevisiae</i> Rad51 protein," <i>J. Biol. Chem.</i> 272:7940-7945.
	Sung and Robberson (1995). "DNA strand exchange mediated by a RAD51-ssDNA nucleoprotein filament with polarity opposite to that of RecA," <i>Cell</i> 82: 453-461.
	Sung (1997). "Function of yeast Rad52 protein as a mediator between replication protein A and the Rad51 recombinase," <i>J. Biol. Chem.</i> 272:28194-28197.
	Sung (1997). "Yeast Rad55 and Rad57 proteins form a heterodimer that functions with replication protein A to promote DNA strand exchange by Rad51 recombinase," <i>Genes Dev.</i> 11:1111-1121.

Examiner Signature	Date Considered
--------------------	-----------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with M.P.E.P. § 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.
CA 103928.1

FIRST INFORMATION DISCLOSURE STATEMENT BY APPLICANT <small>(use as many sheets as necessary)</small>				Complete if Known	
Sheet	5	of	5	Application Number	10/516,982
				Filing Date	June 21, 2005
				First Named Inventor	James T. Kadonaga et al.
				Examiner Name	
				Attorney Docket Number	1034123-000150

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
	Tan, T.L. et al. (1999). "Mouse Rad54 affects DNA conformation and DNA-damage-induced Rad51 foci formation," <i>Curr. Biol.</i> 9:325-328.
	Van Komen, S. et al. (2000). "Superhelicity-driven homologous DNA pairing by yeast recombination factors Rad51 and Rad54," <i>Mol. Cell</i> 6:563-572.
	Varga-Weisz et al. (1977). "Chromatin-remodeling factor CHRAC contains the ATPases ISWI and topoisomerase II," <i>Nature</i> 388:598-602.
	Vignali, M. et al. (2000). "ATP-dependent chromatin-remodeling complexes," <i>Mol. Cell. Biol.</i> 20:1899-1910.
	Yoon et al. (1996). "Targeted gene correction of episomal DNA in mammalian cells mediated by a chimeric RNA-DNA oligonucleotide," <i>PNAS USA</i> 93:2071-2076.
	Yu et al. (1995). "Intracellular immunization of human fetal cord blood stem/progenitor cells with a ribozyme against human immunodeficiency virus type 1," <i>Proc. Natl. Acad. Sci. USA</i> 92:699-703.

Examiner Signature	Date Considered	
--------------------	-----------------	--

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with M.P.E.P. § 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.
CA 103928.1